The Actuarial Profession
making financial sense of the future

Highlights of Life Conference 2011

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Is Mortality Pricing Mad?

It's a mad world!
Odd one out?

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Is Mortality Pricing Mad?

- Sometimes it feels like the mortality pricing world has gone mad.

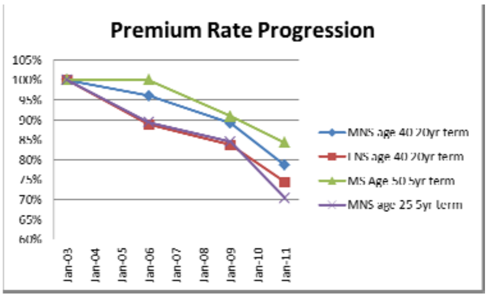
Agenda

- What has happened and why?
- Where are the areas we could be getting it wrong?
- Further thoughts/discussions/questions

- What do you think? ➡ slips on seats

Is Mortality Pricing Mad? What has happened?

- Simples…..
- Prices have fallen significantly over the last decade:



Source: Quotes taken from the exchange

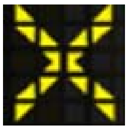
Down 25% in 8 years

Is Mortality Pricing Mad?
What are the drivers for reductions?

- Reassurance rates
- Expense reductions
- Competition / Margin cuts
- Providers' mortality basis
- Providers' lapse assumptions
- Providers' capital
- Commission reductions

Is Mortality Pricing Mad?
What are the drivers for reductions?

• Reassurance rates	(67)
• Expense reductions	(11)
• Competition / Margin cuts	(10)
• Providers' mortality basis	(3)
• Providers' lapse assumptions	(2)
• Providers' capital	(8)
• Commission reductions	(!)



ie reduction is almost entirely driven by views on mortality risk

Is Mortality Pricing Mad?
Aim

- Aim is not to conclude that the pricing of mortality risk within our market is or isn't mad – that's way too complicated and for you to decide!
- The aim is to:
  - highlight that mortality risk pricing isn't easy
  - look at areas where we *could* be going wrong in our pricing of mortality risk
- Make sure that as an industry we are sharing and growing from our collective experiences – greater good v competitive advantage.

Is Mortality Pricing Mad?
Introduction

- The ideas in this presentation pull together a collection of ideas from a range of sources
- Some are likely to be pretty basic
- Nearly all cover 'real life' issues!
- The theme we are exploring necessarily is 'very glass half empty'

➡ **There are lots of good things that we are doing as an industry too!**

Is Mortality Pricing Mad?
Drivers for change: Mortality Improvements

- We are all living longer

The Telegraph

The real problem is we're living too long

THE INDEPENDENT

Why an ageing population is the greatest threat to society

theguardian

Health crisis looms as life expectancy soars

Average ageing forecasts far too low, say scientists

Is Mortality Pricing Mad?
Drivers for change: Mortality Improvements

- **Accidents (not obviously an improving trend):**
- Road/Car Safety
- Legislation
- **Cardiovascular:**
- Smoker Cessation
- Medical Advances
- **Cancer:**
- Detection
- Treatment
- Awareness

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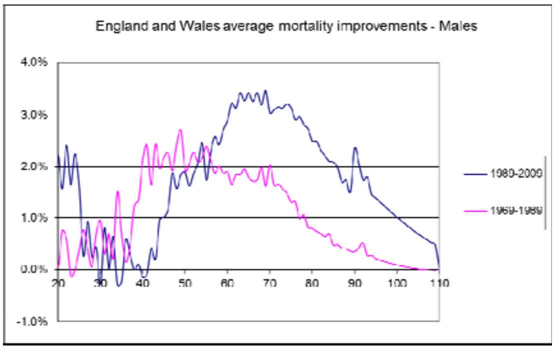
Where could we be going wrong - Improvements



Source: Derived from Death Registrations, Office for National Statistics

- Younger age improvements much lower.
- Aggregating over age range 30-60 helps – but still heavily weighted towards those in their 50s.
- 1% per annum impact could be 10-15% difference

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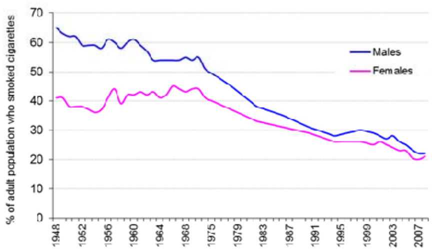
Where could we be going wrong - Smoking



Source: General Lifestyle Survey, Office for National Statistics

- The key driver has been reduction in smoking.
- We are still on a downwards trend and the impact is likely to be felt for years to come.
- Is it appropriate for our insured lives?

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Is Mortality Pricing Mad?
Where could we be going wrong - Smoking

- No – we differentiate price based on smoker status
- Yes – we only ask about the last 12 months
- Yes – some non-smokers will start smoking
- Yes – smokers will give up and not alter policy

- Our conclusion was that, in isolation, you should make some allowance. However…
- Key bit is that it is reflected in experience analysis – need to make sure that we don't double count.
- Our analysis – impact of double counting: 3-4%

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Is Mortality Pricing Mad?
Where could we be going wrong – Alcohol

- A ticking insurance time-bomb?

2009 v 2001	Professionals (Male)	Manual Workers (Male)
Unit consumption by week	▲5%	▼4%
% who drank last week	▼6%	▼13%
% who drank > 5 days last week	▼21%	▼12%
% who drank > 4 units one day	▲5%	▼11%
% who drank > 8 units one day	▲5%	▼10%

- London Alcohol Death hot spots (1998-2004):

Hammersmith and Fulham, Camden, Newham, Hounslow

Source: General Lifestyle Survey, Office for National Statistics

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Is Mortality Pricing Mad?
Where could we be going wrong – Alcohol

- Even worse for women!

2009 v 2001	Professionals (Female)	Manual Workers (Female)
Unit consumption by week	▲17%	▲3%
% who drank last week	▼8%	▼14%
% who drank > 5 days last week	▼26%	▼22%
% who drank > 3 units one day	▲35%	▲15%
% who drank > 6 units one day	▲36%	▲22%

- London Alcohol Death hot spots (1998-2004):

Hammersmith and Fulham, Islington

Source: General Lifestyle Survey, Office for National Statistics

Is Mortality Pricing Mad?
Where could we be going wrong – BMI

- Changes in BMI distribution by income quintiles – an insured lives issue?

Population distribution 2007	Highest	3rd	Lowest
Normal (18.5-25)	31%	37%	37%
Overweight (25-30)	44%	40%	45%
Obese (30-40): rated lives	24%	23%	18%

Change 2003-07	Highest	3rd	Lowest
Normal (18.5-25)	▼ 2%	▲ 2%	▲ 4%
Overweight (25-30)	▼ 1%	▼ 4%	► 0%
Obese (30-40): rated lives	▲ 3%	▲ 2%	▼ 4%

Source: Health Survey for England 2007. The NHS Information Centre

Is Mortality Pricing Mad?
Drivers for change: Underwriting




Is Mortality Pricing Mad?
Drivers for change: Underwriting Developments

- Audits
- Systems
- Tele-interviewing
- Application form improvements
- Underwriting philosophies eg BMI
- Non-disclosure checking
- Combination risks

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Where could we be going wrong – U/W

U/W Decision	1999 profile	2009 profile	Risk Cost
Standard	93%	77%	100
Rated	6%	17%	185
Declined	1%	6%	500
2009 Premium Income	135 = (77% x 100 + 17% x 185 + (6%-1%) x 500) / (93% + 6%)		
1999 Premium Income	105 = (93% x 100 + 6% x 185) / (93% + 6%)		
Additional Income	+29% (or a 22% reduction in premiums)		

Source: SCOR client benchmarking

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Is Mortality Pricing Mad?
Where could we be going wrong – U/W

- **Does experience analysis by underwriting year confirm this huge change?**

- NTU's
- Shopping around for poor risks (electronic submission)
- Cost savings
- Volatility of mortality assumption for 'declines'
- Lapses
- Short-forms – double counting and/or overstating?

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Is Mortality Pricing Mad? Where could we be going wrong – Inflation

- Sum Assured inflation in excess of 5%
- New Business probably around 7 years later than average date of underwriting in experience analysis.

Sum Assured Band	Experience Analysis Mix	Sum Assured Banded Premium	New Business Mix
0-50k	2%	115	1%
50-100k	16%	110	4%
100-150k	27%	105	11%
150-200k	22%	100	18%
200-250k	13%	95	17%
250-300k	7%	90	13%
300k +	14%	85	36%

Is Mortality Pricing Mad? Where could we be going wrong – Inflation

- Impact:

	Experience Analysis	New Business	Change
Risk Cost	99.8	93.5	-6.3%

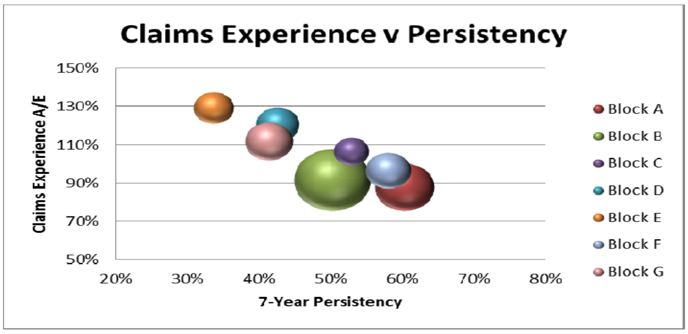
- Are we selling to a different, richer population?
- Or exchange rate – impact in Ireland?
- Amounts analysis – dealing with large claims. Are we truncating without adding back in?

Is Mortality Pricing Mad?
Where could we be going wrong – Lapses

- What do our models tell us?
- Level premium – structural impact: lapse supported
- 50% rebated premium example (age:40 term:25 LTA)
  - 60% year 7 persistency, equivalent of 7% p.a.
  = £15.00 pm
  - 40% year 7 persistency, equivalent of 12% p.a.
  = £14.10 pm

6% premium discount, but….

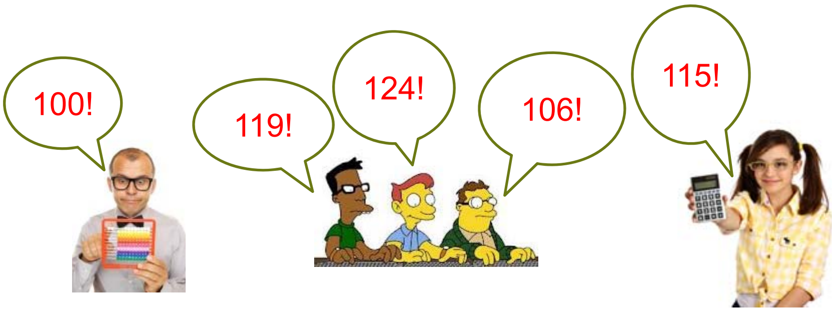
Is Mortality Pricing Mad?
Where could we be going wrong – Lapses



- Evidence of correlation
- 60% persistency v 40% shows approx 20% higher claims experience

Is Mortality Pricing Mad?
Where could we be going wrong – Game Theory

- Put 5 pricing actuaries in the same room…..
- How does the outcome relate to a 1 in 200 event?



Is Mortality Pricing Mad?
Distribution Management:

- It makes sense - must enforce positive behaviour
  - Lower churning
  - Lower non-disclosure
  - Less fraudulent claims
- We should back the ‘winners’
- But do we see the full benefit or does it move the same business around the market?
- Do we price for the ‘losers’?

Is Mortality Pricing Mad?
Other possibilities

- ABI non-disclosure changes
- Increase in accidents/suicides (financial climate)
- Return of the short underwriting form
- Alteration pricing: double counting the select period
- Business mix cross subsidy / price selection?
- Age definition
- Misinterpreting A/E results because of select shape?
- Uni-variate analysis – need to use GLM techniques to avoid ‘overlap’ eg sum assured v distribution

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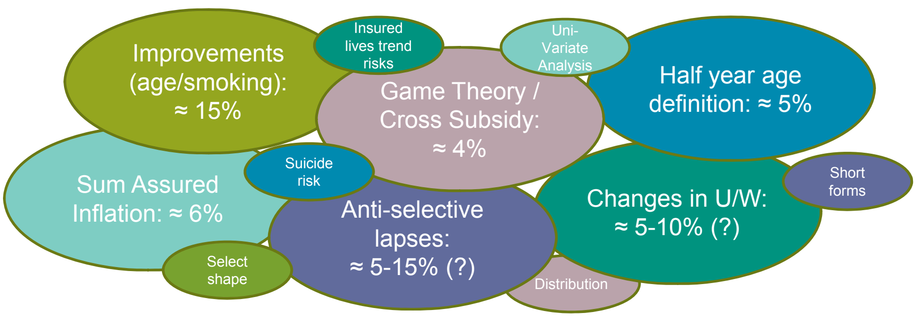
How bad could it be?



- 5% error probably wipes out our shareholder return
- 10% error on a £800m per annum UK term mortality market ≈ £350-400m for 1 years new business. Almost £2bn over 5 years!?

Is Mortality Pricing Mad?
Conclusion: Glass Half Empty

- There are lots of areas where we could make mistakes
- The impact of the mistakes could be material
- We could be making significant losses (that won't emerge until its too late)
- You could build a case for madness!

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Is Mortality Pricing Mad?
Conclusion: Glass Half Full

- Our analysis and understanding of the risk has grown hugely with time and the developments could well justify the pricing
- People probably said the same thing 10 years ago – we didn't get it so wrong after all
- There will always be doom-mongerers: remember CI in the early 2000's?

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The Challenge

- Ensure that pricing actuaries aren't the bankers of the future:
  - peer review (taking a step back)
  - pricing audits
  - no blind following of models
  - share experiences/best practice

Is Mortality Pricing Mad?
What do you say?

Interested in your views:
- is mortality pricing mad?
- what else are we doing wrong?

If you fill out sheet on seat and return or e-mail me then I will collate and send out all responses.

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenter.